

The Partial Eclipse of the Sun (Oct. 23, 2014):

A Viewer's Guide by Andrew Fraknoi (*Foothill College*)

NOTE: Looking at the Sun is DANGEROUS to unprotected eyes; it's best to find an eclipse viewing site with experts, buy special eclipse glasses, or *project* an image of the Sun.

What Is Happening?

An eclipse of the Sun happens when the Moon gets between the Sun and the Earth and covers up some or all of the Sun. Sometimes the Moon covers up *all* of the Sun (a total eclipse), but more often only *part* of the Sun is covered (a partial eclipse.)

This particular eclipse in the afternoon of Thurs., Oct 23 will *not be total* anywhere on Earth – even where the viewing is best, the Moon will still leave part of the Sun uncovered. In the U.S., different cities will see different amounts of coverage, but in no case is the eclipse enough to make the day look darker. Thus, most people will not even notice that the eclipse is going on.

When Will the Eclipse Happen?

The eclipse happens at different times in different cities. An excellent table of U.S. city eclipse circumstances, courtesy of NASA & the Royal Astronomical Society of Canada, is available at:

<http://eclipse.gsfc.nasa.gov/OH/OHtables/OH2014-Tab05.pdf>

On this chart, you can see the times when the eclipse begins, the “maximum” (when the largest fraction of the Sun’s disk is covered by the Moon), and when the Sun ends. Note that in some cases, the Sun sets while the eclipse is happening. Eclipse *magnitude* tells you what fraction of the Sun’s diameter is covered by the Moon, while eclipse *obscuration* tells you what fraction of the Sun’s area is covered.

For example, in Chicago, the eclipse will be at maximum at 5:43 pm and 44% of the Sun’s area will be covered.

Why Is It Dangerous to Watch?

Normally, our common sense protects us from looking directly at the Sun for more than a second or so. The Sun’s visible (and invisible) rays can cause serious damage to the sensitive tissues of the eye, often without the person being immediately aware of it! But when the eclipse happens, astronomical enthusiasm can overwhelm common sense, and people (especially kids) can wind up staring at the Sun for too long. Thus, the best recommendation is not to look without protection.

How Can One Watch the Eclipse Safely?

The best way to see the eclipse is to project an image of the Sun (and not to look at the Sun directly.) One easy way is to make a pinhole projector: Take two pieces of cardboard or thick paper. Put a pinhole in one (taking care to make a clean hole). Then stand with your back to the Sun, and let the Sun’s light fall through the hole and onto the other sheet. You’ll get a small but distinct image of the Sun. (A way to get a sharper pinhole is to cut a square out of the middle of one cardboard, tape a sheet of aluminum foil over the hole and put the pinhole in the foil instead of paper.)

To look at the Sun directly, you need a good filter that can cut out not just light but also ultraviolet and infrared waves. Sunglasses, exposed film, and smoked glass are NOT OK! You can use special black or aluminized polymer filters/glasses available at many science or telescope stores or planetaria; but make sure you get them from a reliable source (such as the Rainbow Symphony company on line.)